Docket No.: DAVOX-159XX

SYSTEM AND METHOD FOR MANAGING A HOLD QUEUE BASED ON

CUSTOMER INFORMATION RETRIEVED FROM A CUSTOMER DATABASE

1   FIELD OF THE INVENTION

2   This invention relates to automated telephone systems and

3   more particularly to a system and method for managing telephone

4   calls that have been placed on hold and are held in a hold queue.

                                BACKGROUND OF THE INVENTION

           Automated telephone systems are in widespread use among users

       such as telemarketing, credit collecting and reservation services.

8   Users of such system desire to optimize system performance by

       attempting to ensure nearly 100% operator productivity while

10   minimizing the number of calls which are placed into a hold queue

11   while waiting for an available operator. This concern arises from

12   the fact that customers who are placed on hold will at some point

13   hang up and be lost.

14   Several prior art systems and methods have been developed to

15   prioritize the order in which calls placed on hold are answered.

16   However, all have been met with limited success. Early systems

17   and methods include prioritizing the on-hold calls based upon the

18   telephone number dialed. For example, long distance callers who

                                         1

are on hold may be handled before on-hold local callers. Another

method involves prioritizing the on-hold calls strictly by age or

the length of time the call has been placed on hold. However,

this method fails to recognize the non-uniformity in the

willingness of customers to remain on hold based upon the length

of time the caller has been on hold. For example, a customer who

has been on hold for 30 or 40 seconds may not be more apt to hang

up then a customer who has been on hold for 10 seconds or less.

Another example is that customers are more apt to hang up when a

message is played during the hold interval. Additionally, such

non-uniformity in hold tolerance will vary and change from user to

user and from call campaign to call campaign.

In order to address the above-identified concerns, more

sophisticated hold queue management systems were developed. An

example of one such sophisticated system is disclosed in U.S.

Patent No. 5,278,898, which issued on Jan. 11, 1994 to the

assignee of the present application and which is incorporated

herein by reference. The '898 Patent discloses a system including

a method for managing calls on hold connected to an automated

telephone system by allowing the system to prioritize the calls on

hold according to selectable, dynamically controllable priority

criteria. This system places connected calls on hold and a call

record corresponding to each of the calls placed on hold is

inserted into a hold queue. Each of the call records includes at

least a first portion identifying the connected call and a second,

call prioritizing portion, which includes predetermined indicia

1 from which call prioritizing may be accomplished. A hold queue

2 prioritizer prioritizes the call records in the hold queue

3 utilizing the predetermined indicia and established a number of

4 call priority categories.

5 Like all of the prior art systems, even this sophisticated,

6 prior art hold queue management system suffers from a significant

7 drawback; namely, it relies solely upon information received from

8 the call itself for prioritization purposes. It fails to take

9 into account the fact that modern automated telephone systems may

10 have the capability of accessing a wealth of information regarding

11 customers that may be stored in a customer database. This

12 information may be vital to the proper prioritization of a

13 telephone call that is placed in a hold queue.

14 Accordingly, there is a need for a system and method of

15 prioritizing telephone calls in a hold queue that accesses a

16 customer database, retrieves information about the customer that

17 is relevant to the prioritization of a telephone call and

18 prioritizes the calls in the hold queue based, at least in part,

19 upon the information it retrieves from the customer database.

20 SUMMARY OF THE INVENTION

21 The present invention provides a system, including a method

22 for prioritizing on hold calls connected to an automated telephone

23 system by utilizing customer information retrieved from a customer

24 database. The method begins by connecting a plurality of calls to

25 the automated telephone system. Caller identifying information is

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obtained from each connected call and each connected call is placed on hold. Then, a customer database is searched and a customer database record is identified corresponding the obtained caller identifying information for each connected call. Selected information, which is relevant to the call prioritizing decision is retrieved from the identified customer database record(s). A call record for each connected call is then created and inserted into a hold queue. Each call record includes the caller identifying information and call prioritizing information corresponding to the connected call. The connected calls are then directed to available agents based on the call prioritizing information stored in each call record in the hold queue.

The system includes a call receiver/director for receiving a plurality of calls connected to an automated telephone system and for directing the plurality of connected calls to a plurality of call center agents coupled to the call receiver/director, responsive to the hold queue prioritizer described hereinafter. The system also includes customer database, which includes a plurality of customer database records, which include caller or customer identifying information and a wealth of additional information regarding the customer, including information relevant to a call prioritizing decision.

A hold queue prioritizer is also included. The hold queue prioritizer obtains the caller identifying information from each connected call and searches the customer database to identify a customer record or records that includes the caller identifying

1 information it obtained from each connected call. The hold queue

2 prioritizer then retrieves information from the identified call

3 record(s), which is relevant to the call prioritizing decision.

4 A call record is then generated by the hold queue

5 prioritizer, which includes the caller identifying information and

6 the call prioritizing information for each connected call.

7 Finally at least one hold queue is provided, which is coupled

8 to the hold queue prioritizer. The hold queue includes a

9 plurality of memory locations in which a corresponding plurality

10 of call records may be inserted.

DESCRIPTION OF THE DRAWINGS

12 These and other features and advantages of the present

13 invention will be better understood by reading the following

14 detailed description, taken together with the drawings wherein:

15 Fig. 1 is a block diagram of a system for prioritizing call

16 records in a hold queue based on customer information maintained

17 in a customer database, according to one embodiment of the present

18 invention;

19 Fig. 2 is a flow chart of a method for prioritizing call

20 records in a hold queue according the one embodiment of the

21 present invention; and

22 Fig. 3 is a more detailed flow chart of a method for

23 prioritizing call records in a hold queue showing alternative

24 methods of selecting a call to connect to an available agent.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The system for prioritizing calls on hold in a hold queue according to the present invention is shown within dashed line 10 in Fig. 1. The on hold call prioritizing system 10 includes a call receiver/director 12, which is coupled to one or more telephone lines 14. Call receiver/director 12 is typically a private branch exchange (PBX) telephone switching system that can connect to and switch a number of telephone lines. In the preferred embodiment, the PBX or similar telephone line switch forms a part of an automated telephone calling/answer system. Such systems are well known to those skilled in the art and include systems such as the CAS 2000 and CRS 2000 systems, available from DAVOX Corporation of Westford, Massachusetts.

Call receiver/director 12 is also coupled to one or more call center agent terminals 16, which are capable of being connected to at least one telephone line 14. The call receiver/director 12 also monitors and keeps track of the availability of one or more agents at the call center agent terminals 16. The agent terminals are described in greater detail in U.S. Pat. No. 5,164,981, entitled Voice Response System with Automated Data Transfer, which issued to the assignee of the present invention on November 17, 1992 and which is incorporated herein by reference.

In the preferred embodiment, the agent terminals 16 are also capable of simultaneously connecting to a computer system 18, including a customer database 20, which includes a plurality of customer database files or records. The customer database records

1   include information regarding a plurality of callers or customers,

2   including identifying information as well as information that may

3   be useful in aiding the on hold call prioritizing system of the

4   present invention in making a determination as to which calls on

5   hold should be handled on a priority basis.

6   For example, a database record may identify a customer as the

7   holder of a "gold" or "platinum" credit card, in which case a call

8   related to that account would be flagged as a priority call.

9   Other information that may be stored in a particular customer

10   database record, such as a record of a recent purchase that may be

11   an indicator that the particular customer is a likely candidate to

12   purchase a specific article or service through a telemarketing

13   firm. In any event, the customer database is an integral part of

14   the present invention for it is the information contained therein

15   that is utilized by the hold queue call prioritizing system in its

16   prioritizing decision.

17   Upon the connection of one or more calls over telephone lines

18   14 to the call receiver/director 12, the call receiver/director

19   obtains caller identifying information from the connected call. In

20   one embodiment of the invention, the caller identifying

21   information may include a telephone number from which an incoming

22   call is placed. This can be obtained using well known automatic

23   number identification (ANI) systems as well as other "call

24   tracker" systems and methods. In another embodiment, the call

25   receiver/director may obtain caller identifying information

26   directly from the caller using an integrated voice response (IVR)

1 unit, such as the one described in greater detail in the above-

2 identified U.S. Pat. No. 5,164,981. Of course, other systems and

3 methods of obtaining caller identifying information from a caller

4 are contemplated by the invention.

5 When the call receiver/director obtains the caller

6 identifying information from a connected call, it places the

7 connected call on hold and forwards the connected caller

8 identifying information to a hold queue prioritizer 22. Upon

9 receipt of the caller identifying information corresponding to

10 each connected call that has been placed on hold, the hold queue

11 prioritizer searches the customer database 20 to identify any

12 customer records that include the same caller identifying

13 information it received from the call receiver/director 12. If

14 one or more customer records are identified, then the call queue

15 prioritizer will retrieve selected information from the identified

16 customer record(s) that is relevant to prioritizing the connected

17 call.

18 In credit collection scenarios, examples of call prioritizing

19 information include the type of account, the outstanding balance,

20 the age of the outstanding balance and other like information.

21 For telemarketing scenarios, examples of call prioritizing

22 information may include customer buying trends or specific

23 customer purchase transactions that would be related to the goal

24 of the current telemarketing campaign.

25 Once the hold queue prioritizer retrieves the relevant call

26 prioritizing information or data, it creates a call record 24 for

1 each connected call that is placed on hold. Each call record

2 includes both the caller identifying information that the hold

3 queue prioritizer received from the call receiver/director as well

4 as the call prioritizing information that it retrieved from the

5 customer database record(s). The call records 24 are then

6 inserted into a hold queue 26, until the on hold connected calls

7 are connected to an available agent 16.

8 The hold queue 26 typically includes a plurality of storage

9 locations such as registers or memory locations in which the

10 plurality of call records are stored. As indicated above, each

11 call record 24 preferably includes a caller identifying portion

12 27, which identifies the connected call by a number, telephone

13 line or other similar identification indicia. Each call record

14 also includes a call prioritizing portion 28, which is related to

15 the call prioritizing information that the hold queue prioritizer

16 22 retrieves from the customer database records.

17 In one embodiment, the call prioritizing portion 28 may

18 include raw data retrieved from the customer database records, an

19 example of which may include the letter "P" to indicate that the

20 pertinent caller on hold is a platinum credit card holder. In

21 other embodiments, the call prioritizing portion 28 may include a

22 call prioritization index, which is derived by the hold queue

23 prioritizer 22 based on one or more pieces of information that it

24 retrieves from a customer database record. Examples of call

25 prioritization indices include alphabetical call priority

26 designations, such as "H", "N" and "L", representing high, normal

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1 and low priority calls, respectively.

2   Alternatively, call prioritization indices may include call

3 numeric call priority scores. Such scores may absolute or

4 relative scores. With the former, multiple connected calls may be

5 assigned identical call priority scores, in which case a

6 subsequent decision process must be employed in order to determine

7 which of the calls having the same call priority score should be

8 connected to an available agent first. Examples of supplemental

9 decision strategies included first-in, first-out (FIFO) or last-

10 in, first-out (LIFO) strategies for identically scored connected

11 calls. Of course more sophisticated supplemental decision

12 strategies that take into account the precise nature of a specific

13 connected call and non-uniformities associated therewith, such as

14 those described in U.S. Pat. no. 5,278,898, are also contemplated

15 by the present invention.

16   With relative numeric call priority scores, a connected call

17 can be directed to available agent when it has the highest (or

18 lowest depending on the strategy employed) numeric call priority

19 score of all of the call records stored in the hold queue. Of

20 course such a relative numeric call priority score embodiment will

21 include the ability to dynamically adjust the relative call

22 priority scores assigned to the call records included in the hold

23 queue as additional call records are inserted into the queue.

24   The present invention also includes a method of prioritizing

25 connected calls in a hold queue, which is illustrated in the flow

26 charts of Figs. 2 and 3. The method 100 begins by connecting a

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1 plurality of calls to an automated telephone system, step 110. As

2 each call is connected, the automated telephone system, and in

3 particular the system's call receiver/director, obtains caller

4 identifying information from each connected call, step 120. This

5 step contemplates a wide variety of "call tracker" means for

6 obtaining various types of caller identifying information, such as

7 the ANI and IVR systems mentioned above. The connected call is

8 then placed on hold, step 130.

9 Once a connected call is identified and the call is placed on

10 hold, the automated telephone system, and in particular, the hold

11 queue prioritizer, searches a plurality of customer database

12 records maintained in a customer database to identify customer

13 database records that correspond to the caller identifying

14 information received from a connected call, step 140. The

15 customer database is provided by the customer and is usually the

16 corporate customer information typically residing on a main frame

17 computer. One or more types of information obtained by the "call

18 tracker" system can be used to search the customer database to

19 find corresponding records.

20 In step 150, the hold queue prioritizer retrieves information

21 stored in the identified customer database records that may be

22 relevant to a call prioritization decision. As indicated above, a

23 wide variety of information may be relevant to a specific

24 connected call depending upon the precise nature of the call.

25 Therefore, the system allows a system supervisor to program the

26 system to look for different types of customer information in the

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1　customer database records.

2　　Once a connected call is identified and call prioritizing

3　information is retrieved from the corresponding customer database

4　records, the call queue prioritizer creates a call record for each

5　connected call, step 160.　Each call record includes both the

6　caller identifying information and the call prioritizing

7　information or a derivative thereof, as such as the alphabetic or

8　numerical call priority indices or scores explained earlier.

9　　Each call record is then inserted into a call hold queue,

10　step 170.　The automated telephone system then directs the

11　connected calls to a plurality of available agents based on the

12　call prioritizing information included in each call record stored

13　in the hold queue, step 200.

14　　Fig. 3 shows, in more detail, two alternative embodiments

15　contemplated by the invention for directing connected calls to

16　available agents, step 200 of Fig. 2.　(Steps 110-160 in Fig. 3

17　are identical to the identically numbered steps explained above

18　with respect to Fig. 2.)

19　　In a first embodiment of the invention, when a call center

20　agent completes a previous call, that call center agent becomes an

21　available agent. Once an agent becomes an available agent, the

22　automated telephone system will display a list of the call records

23　in the call hold queue, including the connected call identifying

24　information and the corresponding prioritizing information, on the

25　agent display, step 210.　The available agent thereafter selects a

26　call to direct to the available agent based on the displayed call

1 prioritizing information, step 220. In this embodiment, the

2 available agent may manually select a call to direct to that agent

3 irrespective of its relative position in the hold queue. In

4 addition, since certain agents may have expertise in handling

5 certain types of calls, different agents may select calls based on

6 both the connected call identifying information as well as the

7 call prioritizing information. For example, a Spanish speaking

8 agent may select a call to handle that has a lower priority than

9 an incoming call from an English speaking customer. Thus, this

10 embodiment would allow a great deal of real-time agent decision-

11 making in the call handling process.

12 In a second embodiment, the automated telephone system

13 compares the prioritizing information retrieved for each call

14 record with at least one predetermined prioritization attribute,

15 step 212. Then, the system arranges the call records in the hold

16 queue in a prioritized order according to the prioritizing

17 information comparison, step 222. Finally, in this embodiment,

18 the automated telephone system automatically directs the call that

19 is at the top of the call record arrangement to an available

20 agent, step 232. Since this second embodiment envisions an

21 automated decision process, the decision criterion must be capable

22 of being updated from time to time by a system supervisor. In

23 addition, this automated decision making embodiment also allows

24 the call records in the hold queue to be re-arranged or re-ordered

25 as additional call records are inserted into the queue.

26 Accordingly, the disclosed system and method improves upon

1 the prior art by allowing calls on hold to be prioritized based on

2 customer information that is retrieved from customer database

3 records stored in a customer database, which information may be

4 more relevant to the prioritization decision than information that

5 is obtained directly from a connected call, such as, for example

6 from ANI or IVR systems.

7 Modifications and substitutions by one of ordinary skill in

8 the art are considered to be within the scope of the present

9 invention which is not to be limited except by the claims which

10 follow.

11 What is claimed is: